

Detailed Research Plan
Preliminary Project Title
Your Name, Partners Name
Date, Period

A. The Problem, *written in question form.* (1-3 paragraphs):

The question guiding this science fair experiment is:

Define what words such as best, fastest least effort, most, energy, power, etc. with measurable specific parameters

B. Research (2-5 paragraphs):

Rough Draft of background research summery of important and useful information that is necessary for the research project or engineering design, including citations

C. The Hypothesis *written in If...then form and do not use pronouns. Use shall not or will not to make the statement negative.* (1 sentence):

The hypothesis is:

D. Purpose (1-2 paragraphs):

Why is this research important give specific points, why should someone care? How is it applicable to our community or the real world? Rational should be supported by your back ground research.

E. Experimental variables (list form):

Independent:

Dependent:

Controls: (Should include at least 5 controls)

F. Materials (Table with additional wordage as needed1-2 paragraphs):

List the materials that will be used and include specific amounts when appropriate, where materials can be sourced, costs, time needed to acquire, any specific hazards or dangers associated with materials:

Material	Total amount needed	Cost/ (Total)	Sources	Time to acquire	Hazards and dangers	Alternates or substitutions	Storage requirements
ferns	40	\$1.50- #2.00/ (\$60.00- \$80.00)	Lowe's, Home Depot, XYZ Nursery HI, Tucson	Day of	Do not ingest	Mex Petunia	Partial sun with daily water

G. Methods (1-2 paragraphs):

Describe the general methods to be used, and why are you using the methods you have chosen? Why have you chosen the described controls? Examples would be spectroscopy, photometric methods, direct measurement, volume displacement, voltage, energy output, etc. **What is/ are your measure end point(s)?**

- H. Experimental Procedures (list form, each step being 1-3 sentences and explanations 1-3 paragraphs):
State your **detailed** methods, so that others could repeat your work exactly. Include details, giving exact specifications and quantities. [Your procedure will describe how you plan to do your experiment, changing only one variable at a time, and keeping all the other parameters the same]. Describe your control so that you can compare results of your experiment with a standard for which the variable is unchanged. Make sure that you have three or more reaction/ devices/plants/subjects in each of the control and experimental groups. Even better, have several experimental groups (e.g. more than one concentration of chemical you are testing, more than one time point, etc). Periodically calibrate your equipment and reagents. Make measurements in metric units when possible. Repeat the test more than once to see if your results are reproducible.
- I. Methods of Data Collection (2-4 paragraphs):
If you used a published method, reference the method, but describe any changes you made to it. If you used experimental organisms, identify them by genus and species. If you used a standard instrument, it suffices merely to name it, but if you devised a new or special method, describe it completely.
- J. Expected results (1 paragraphs):
What are the expected results of your experiment and how will you show those results, include research sources that support your expectations?
- K. Limitations (list form, each step being 1-3 sentences and explanations 1-3 paragraphs):
List of items, procedures or things you have complete control over in your experiment.
- L. Delimitations (list form, each step being 1-3 sentences and explanations 1-3 paragraphs):
List of items, procedures or things you have no control over
- M. Bibliography (Reported in APA format. You need a minimum of 5*):
**3 of the sources can be internet websites, 2 of the sources must be another type of resource ex. Book, encyclopedia, science journal, magazine, etc. (these may be found online as digital copies)*

Note: You must have this research plan approved before you start your experiment. Please have Mr. Golden/ teacher sign below.

I approve this research plan.

Teacher Name: _____

Teacher signature: _____

NEXT STEP: Once approved, Attach your completed research plan to Form 3

*Adapted from
science-fair.org
plainlocal.org*